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LOCKHEED MARTIN

Via Facsimile & U. S. Mail
RED0600/062 WBS 48

June 15, 2000

Mr. Gerald J. Thibeault
Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

**Subject: Quarterly Report – March through May 2000**
**Cleanup and Abatement Order No. 97-58**
**Lockheed Martin Corporation**

Dear Mr. Thibeault:

This Report covers activity for the months of March through May 2000. The report is submitted in accordance with Board Order No. 97-58 and the approved 15 August 1997 Work Plan and Schedule.

## 1.0 Perchlorate Sampling

Technical data on perchlorate, associated with the regular Water Supply Contingency Policy sampling, was submitted in monthly format to the RWQCB under separate cover. The reports are entitled, "Production Well Sampling Report, Water Supply Contingency Plan, Crafton-Redlands Plume Project."

## 2.0 Modeling of Perchlorate Migration and Potential Impacts

Updated forecasts of perchlorate concentrations are now anticipated to be completed during the fourth quarter of 2000. The revised numerical model will incorporate updates to basin hydrostratigraphy, plume initial conditions, and projections of flow for various new and existing Bunker Hill Basin wells.

## 3.0 Treatment Technology Applicability Review

This update presents recent developments in treatment technology research.

## 3.1 Perchlorate Treatment Technology Update

This update is divided into two parts: on-going research efforts sponsored by Lockheed Martin, and highlights of research efforts by other groups such as technology companies, public agencies and universities.

### 3.1.1 Testing Sponsored by Lockheed Martin

Lockheed Martin is continuing to conduct research on various ion exchange process options. This research includes field tests recently begun at a Gage Canal Company well of different resins that could be used in a fixed bed treatment approach.

#### Pilot Testing at Gage New 6

Seven combinations of fixed bed ion exchange resins and regeneration techniques are being tested by Lockheed Martin. One of the resins and two of the regeneration techniques reflect the use of advanced, proprietary technology. The remainder of the resins and regeneration techniques are commonly available. Influent concentrations to the columns range from 50 to 150 ppb (through spiking) of perchlorate. As pilot data is obtained, it is carefully evaluated and then used to refine a full scale system model. The results of the technical and economic modeling are used to eliminate less effective technologies and to refine the sampling sequences in order to optimize the data acquired in subsequent runs. At this time, one resin and possibly one regeneration technique appear to be marginal. At the same time, valuable design information on column loading rates and resin regeneration characteristics has been obtained. In addition, field verification of earlier bench scale testing has been accomplished. Effluent levels of 4 ppb of perchlorate have been obtained in all columns tested.

### 3.1.2 Testing Sponsored by Other Groups

#### Pilot Tests of the Calgon ISEP System

Calgon has a contract with the La Puente Valley County Water District to operate a 2,500 gpm ISEP system to remove perchlorate from a water supply well with 50 ppb to 100 ppb perchlorate concentrations. Treated water from the full-scale system is being discharged to spreading basins for an extended period of time until the Department of Health Services grants a permit and allows the treated water to be distributed into a drinking water system.

### Biological Treatment Testing Sponsored by Aerojet

Aerojet is negotiating with the City of La Puente to pilot test the biological treatment process at this site. This work is being done in conjunction with the Baldwin Park Operable Unit Steering Committee and the Main San Gabriel Basin Watermaster. Please note that additional process steps would be required following the biological process in applications where the treated water is used directly for drinking water. These processes could include multi-media filters and granular activated carbon. As we understand the pilot test, treated water from the bioreactor will be filtered, fed to an ultraviolet-ozonation system for removal of NDMA and VOCs, then spiked with 1,4- dioxane before treatment in a bituminous carbon bed.

### American Water Works Association Research Foundation (AWWARF) - Perchlorate Research Projects

Eight perchlorate related research contracts were awarded by AWWARF in 1998. The research includes investigation of perchlorate removal/destruction by biological means, ion exchange, reverse osmosis and nanofiltration. Seven of the eight research teams are scheduled to complete their work in 2001, with one team to complete their work this year. Background information on these studies is posted by AWWARF at their website: http://www.awwarf.com/.

## 4.0 Water Supply Contingency Options

### 4.1 City of Riverside

The City of Riverside continues to blend perchlorate to levels below the provisional action level.

### 4.2 City of Loma Linda

Lockheed Martin is in the process of installing up to three new production wells for the City of Loma Linda to avoid the perchlorate plume. Each new well is intended to replace a well that has been or will be abandoned as a result of impacts from the perchlorate plume.

The first well, designated as COLL Mountain View #3, is located on the same City property as former COLL Mountain View #1 production well (now abandoned). Mountain View #3 has been installed to a total depth of 1,590 feet below ground surface (ft-bgs), and has been equipped for temporary use with the refurbished pump that was removed from Mountain View #1. This well has an off-specification annular seal at depth; thus, LMC has been asked to replace the well. A permit application for use of the well was submitted to the California Department of Health

Services (DHS) and was conditionally approved on October 28, 1999. Mountain View #3 began pumping to the COLL water distribution system on November 2, 1999. While the effectiveness of the annular seal is suspect, this well continues to be non-detect for perchlorate and TCE.

The second of the new production wells is designated as COLL Richardson #4 and is located on Gould Street approximately 400 feet west of Richardson Street. Richardson #4 has been installed to a total depth of 1,475 ft-bgs and the temporary pump has been installed. The Richardson #4 temporary well pump construction is complete with the exception of the some minor punch list items. The DHS sampling was completed on May 31, 2000 in with DHS' concurrence. A field meeting is scheduled for mid-June with COLL and LMC representatives to close out the construction punch list. DHS is also scheduled to conduct their well inspection in mid-June. We anticipate that Richardson #4 will be available for use in late June.

The third new production well, known as Mountain View #4, has been installed and developed. The new well is located at the southwest corner of the intersection of the Interstate 10 Freeway and Mountain View Avenue. Initial construction and site grading for the temporary pump installation began the week of June 4$^{th}$ 2000 and is scheduled to be completed at the end of July 2000.

A fourth new production well, to be known as Mountain View #5, may be installed later this year to replace the off-specification Mountain View #3 well. Mountain View #3 may or may not be retained as a backup supply well.

### 4.3 Victoria Farms

In late May, Lockheed Martin submitted a written proposal regarding permanent solutions to Victoria Farms; this proposal is intended to resolve issues remaining from the draft (July 1997) Water Supply Contingency Agreement. Victoria Farms is in the process of responding with comments to LMC's proposal. Victoria Farms currently receives water from the City of San Bernardino under a temporary water supply agreement. Lockheed Martin is reimbursing Victoria Farms for the incremental cost of the imported water.

### 4.4 City of Redlands

The City of Redlands is avoiding perchlorate through the active management of their surface water and groundwater resources. In 1999, Lockheed Martin and the City of Redlands came to terms on past TCE and perchlorate response costs submitted by the City of Redlands. The City of Redlands has requested to meet with Lockheed Martin in the near future regarding potential, future response costs.

### 4.5 Mountain View Power Company (formerly Southern California Edison)

No perchlorate has been detected in the Mountain View Power Company wells. The Mountain View Power Company plans to increase pumping at wells SCE Nos. 1 and 2 for cooling water purposes.

### 4.6 Loma Linda University

No Perchlorate was detected above the action level in the Loma Linda University wells.

## 5.0 Perchlorate Study Group

The Perchlorate Study Group (PSG) continues to provide financial support for ongoing toxicology research on perchlorate. As they are completed, the results of these studies are being forwarded to the Interagency Perchlorate Steering Committee, which includes members from the U.S. EPA and California EPA.

In cooperation with the PSG, the U.S. EPA, and the United States Air Force, Lockheed Martin helped coordinate a multiple lab test of numerous chemical fertilizers for the presence of perchlorate in 1999. The USAF has the lead in publishing of this report (expected to be available in the year 2000).

We understand that the U.S. EPA's draft "Reference Dose" (RfD) for perchlorate (published in December 1998) will be assessed in a second external peer review sometime in the fall of 2000. The U.S. EPA is currently expecting toxicological results from several new studies to determine if the draft RfD (equivalent to 32 ppb in water) should be finalized or revised.

## 6.0 Closing

The next quarterly update will be submitted on or about September 15, 2000. If you have any questions, please contact Carol Yuge at (818) 847-0197.

Sincerely,

Thomas D. Blackman
Technical Project Manager

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